

8

MEMOIR of a CHART

*from*

CAPE MONS *to* ACHEEN

Scale  $\frac{8}{10}$  of inch = 1°

By

Dalrymple.

K.

LONDON, printed by GEORGE BIGG, 1785.



Jos: Banks



21 Dec. 1784.

THE *Standard Positions*, on which THIS CHART was constructed, are the following: those marked with \* being the Result of *Astronomical Observations on Shoar*.

|                            | N. Lat.     |             | E. Long. |                                                                                                                                         |
|----------------------------|-------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|
| * Bombay                   | 18° 56'.40" | H. Th. Howe | 72° 38'  | H. Th. Howe. Mean 2 Ecl. 1st Sat. <i>Jupiter</i> { 72° 36"<br>72° 40"                                                                   |
| Sacrifice Rock             | 11.29       | D°          | 75.15    | Capt. James Dundas by <i>Arnold's Chronometer</i> .                                                                                     |
| Cochin                     | 9.58        | D°          | 75.58    | D°                                                                                                                                      |
| Anjengo                    | 8.41        | <i>D</i>    | 76.30    | D° Mean { 76.28<br>76.32                                                                                                                |
| Cadiapatam Point           | 8.7         | H. Th. Howe | 77.8     | <i>D</i> by <i>Arnold's Chronometer</i> to Ajengo.                                                                                      |
| Cape Comarin               |             |             | 77.20    | <i>D</i> d° . . d° 77° 19'.15"<br>from Pt. de Galle 77° 22'.24"                                                                         |
| Calutare on <i>Ceyloan</i> |             |             | 79.48    | C. Dundas by <i>Chronometer</i> .                                                                                                       |
| Point de Galle d°          |             |             | 80.7     | D°                                                                                                                                      |
| <i>Great Basses</i> d°     |             |             | 81.30    | D°                                                                                                                                      |
| * Tranquebar               | 10.56       |             | 79.32    | Phil. Transf. Vol. 52. <i>Transit of Venus</i> .                                                                                        |
| * Pondicherry              | 11.41.55    |             | 79.52.45 | M. Le Gentil 7 Eclipses 1st Sat. <i>Jupiter</i><br>Mem. de l'Acad. des Sciences 1773.                                                   |
| * Fort St. George          | 13.5        |             | 80.28.45 | H. Th. Howe. Eclipse 1st Sat. <i>Jupiter</i>                                                                                            |
| * Vizagapatam              | 17.42       | H. Th. Howe | 83.22    | Col. Pearse Eclipse 2d Sat. <i>Jupiter</i> 83.24.30<br>Claud. Russel Esq. Mean } 83.21.30<br>many Distances ☉ and ☾ }                   |
| * Calcutta                 | 22.35       |             | 88.30    | H. Th. Howe. Ecl. 1st Sat. <i>Jupiter</i> 88.33<br>Rev. William Smith . . . 88.28<br>Mr. Magee . . . 88.24<br>Capt. Ritchie . . . 88.26 |
| * Mergui                   | 12.12       |             | 98.19.15 | M. D'Aprés. Imm. 1st Sat. <i>Jupiter</i> 1740.                                                                                          |

The:



The *Longitudes*, deduced from *Chronometers* going well, in short runs from *Places* whose situations are exactly determined, are so much more precise than any casual Astronomical Observation, that I have no scruple of preferring Capt. *Dundas's* LONGITUDE of COCHIN, by one of *Arnold's Chronometers*, to the Rev. *William Smith's* Observation *there* of an *Eclipse*: but it may be requisite to give, circumstantially, the reasons by which I am led to this determination, different from the very respectable Authority of my Friend Major *Rennell*, who has adopted the Reverend Mr. *Smith's* LONGITUDE of COCHIN  $76^{\circ} 26' 30''$  in preference to that by Capt. *Dundas*  $75^{\circ} 58'$  being to the Westward of the Rev. Mr. *Smith*  $28^{\circ} 30'$  and having adopted the Hon. Mr. *Howe's* LONGITUDE of FORT ST. GEORGE  $80^{\circ} 29'$ , Major *Rennell* has therefore been induced, from that Result, to rely on the *distances* in some MS. *Maps*, and has contracted the *breadth* of the PROMONTARY, almost half a degree.

The Authority of a *Chronometer* depending on its *rate*, It is necessary to discuss the reasons on which Capt. *Dundas* infers the *uniformity* of that *rate*.

He found, in about four months, from England to the Cape-Good-Hope, the *Chronometer* gave the *Longitude* of The CAPE *exactly*; and that, during almost a month he remained there, the extreme difference, of all his Observations, was only 2', the *error* being each way from the *True Longitude*, consequently never more than 1': which



which Capt. Dundas very reasonably ascribed to his error in finding the Time.

The Longitude of *Calutará* on CEYLOAN, of *ANJENGO*, COCHIN, and the other Places on the MALABAR COAST, before he reached ONOR, were determined by Capt. Dundas in his Passage from the CAPE-GOOD-HOPE to BOMBAY.

Unfortunately at ONOR, the *Chronometer* met with an accident, which is much to be regretted; because, the position of BOMBAY being well determined, Its *Longitude* by *Chronometer*, would have shewn whether *that Machine* had continued, from CAPE-GOOD-HOPE, to go equally exact as before.

Capt. Dundas informs me he took great pains to ascertain *its* rate at BOMBAY; and from the rate so ascertained, His *Longitudes* of *Point de Galle*, and of the *Basses* off *Ceyloan*, and of Fort ST. GEORGE, are determined: The exact agreement with the Hon. Mr. Howe's *Longitude* of Fort ST. GEORGE, confirms very strongly the *Longitude* of *Point de Galle*, and the *Basses*.

The *Longitude* respectively of *Calutará*, determined by Capt. Dundas, in his Passage from the CAPE-GOOD-HOPE to BOMBAY, and *that* of *Point de Galle*, in his Passage from BOMBAY to MADRASS, agrees exactly with the *difference* of *Longitude* between them, in the *Map* of

B

CEYLOAN.



CEYLOAN published by *Reland*, which has all the appearance of being a good one; altho' the vicinity and reciprocal situations are such, that the Map must be incredibly erroneous, to produce an essential difference in the reciprocal Longitudes of those two Places, and therefore we have a strong testimony of the accuracy of Capt. Dundas's *Chronometer* from THE CAPE-GOOD-HOPE to CEYLOAN, and thence the greatest reason to infer *Its* accuracy afterwards, 'till the accident which happened at ONOR.

A further testimony of the accuracy of the *rate* ascertained at BOMBAY, is the accordance with the *Map* of CEYLOAN, in the reciprocal Longitudes of *Point de Galle* and the *Basses*, where an *error* in the *Chronometer* would be immediately obvious, those places being nearly under a parallel.

Major *Rennell* infers the difference of *Longitude* between *Point de Galle* and *Cape Comarin*, from my Observations with another of *Arnold's Chronometers* to be about  $2^{\circ} 37'$ : but I find I reckon it  $2^{\circ} 44'. 36''$  this taken from Captain Dundas's Longitude of *Point de Galle*  $80. 7. 0$

gives  $77. 22. 24$  for the longitude of *Cape Comarin*. By my Observation of the *Chronometer* carried on from *Cape Comarin* to *Anjengo* I make  $49'. 15''$   
Capt.



Capt. Dundas's Observations at *Anjengo* differ 4' in the *Longitude*;

|                                               |   |   |          |           |         |
|-----------------------------------------------|---|---|----------|-----------|---------|
| One placing it in                             | - | - | 76° 28'. | the other | 76° 32' |
| My difference of <i>Longitude</i> being added |   |   | 49. 15.  |           | 49. 15. |

|                       |   |   |             |              |             |
|-----------------------|---|---|-------------|--------------|-------------|
| gives in the one case | - | - | 77. 17. 15. | in the other | 77. 21. 15. |
|-----------------------|---|---|-------------|--------------|-------------|

for the *Longitude* of *Cape Comarin*; differing from the former result, in the first case 5'. 9". in the last only 1'. 9". this difference may easily have arisen in my Observations; my wonder is that they agree so nearly with Capt. Dundas.

I shall now consider the reverend Mr. Smith's Observation, on 11<sup>th</sup> May 1777, at COCHIN.

He tells us that *Jupiter* was low and somewhat hazy; The *Longitude* however he infers, from his Observation, to be 76° 26'. 30". E \* I have not been able to obtain a correspondent Observation, but by an Observation made  
next

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\* The Rev. Mr. Smith's paper of his Observations says the Eclipse happened  
 $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ \text{at } 9 \quad 23 \quad 36 \end{array}$  by the *Watch*, and states the *Watch* to have been 59 too fast, a few  
minutes after the Observation:  $\begin{array}{r} \text{s} \\ 59 \end{array}$  taken from  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 9 \cdot 23 \cdot 36 \end{array}$  leaves  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 9 \cdot 22 \cdot 37 \end{array}$  for  
*Apparent Time of Observation*, by the *Tables* it was at *Greenwich*  $\begin{array}{r} 4 \cdot 16 \cdot 31 \\ \hline 5 \cdot 6 \cdot 6 \text{ or} \end{array}$   
76° 31'. 30". E instead of 76° 26'. 30". as the Rev. Mr. Smith states it.



next day,\* by the late Mr. *Wargentin*, which he obligingly communicated, there was an error, in the Tables, of 3'. by which the Reverend Mr. *Smith's Longitude* of COCHIN

|                       |   |   |   |               |
|-----------------------|---|---|---|---------------|
| will be reduced to    | - | - | - | 76° 23'. 30'' |
| Capt. <i>Dundas's</i> | - | - | - | 75. 58        |
| difference            |   |   |   | 0. 25. 30     |

The Reverend Mr. *Smith* observed the *Longitude* at MADRASS also; there is a difference in the result, by his own calculation, and by the calculation of the *Astronomer Royal*, amounting to 20'. 45''. but both exceeded the *Longitude* observed by the Hon. Mr. *Howe*, viz.

|                                                        |               | calculated              |
|--------------------------------------------------------|---------------|-------------------------|
|                                                        | By himself.   | By Astro. Roy.          |
| The Reverend Mr. <i>Smith's</i> Observation at MADRASS | 81° 1'. 45''. | 80° 41.                 |
| The Hon. Mr. <i>Howe's</i>                             | 80. 28. 45    | 80. 28. 45              |
| difference                                             |               | 0. 33. 0      0. 12. 15 |

An

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\* I suspect a mistake here, for Mr. *Wargentin* in a letter to Mr. *Dryander* says by an *Observation* of *his*, on the 2<sup>d</sup> May, The Tables were 11<sup>s</sup> too late; I cannot find the *Observation* of Mr. *Wargentin* on the 12<sup>th</sup>, above alluded to, and in that communicated to Mr. *Dryander*, he says the *Eclipse* ought to have happened at *Greenwich* at 4. 17. 3. which is not consonant to the error of 11'' either + or - tho' it yields the Long. 76° 23'. 30'' E. above recited: allowing for the error of the Tables 11'' too late, The *longitude* of COCHIN, according to the Rev. Mr. *Smith's* Observation, will be 76° 34'. 45'' E. but by comparing Mr. *Wargentin's* Observation of the 2<sup>d</sup> it appears the Tables were 32<sup>s</sup> too early, instead of 11<sup>s</sup> too late, on the 2<sup>d</sup>; and therefore the Rev. Mr. *Smith's* Observation will give 76° 23'. 30'' E. as above represented. The *calculated Times*, as given by Mr. *Wargentin*, differ very considerably from the Tables in the *Nautical Almanac*, for January 1776; but he does not give the *calculated Time* of 11<sup>th</sup> May 1777.



An error in the reverend Mr. *Smith's* computation of the *Longitude* of COCHIN, equivalent to that in his computation of the *Longitude* observed at MADRASS, will reduce the difference between him and Capt. *Dundas* to less than 5'. but admitting his computation to be just, the difference 0° 33'. 0". between his Observation and the Hon.

Mr. *Howe's* at MADRASS is greater than the difference 0° 25'. 30" between *his* and Capt. *Dundas's* Observation at COCHIN.

0° 7'. 30"

I have upon the whole no hesitation to prefer the *Longitude* of COCHIN deduced from the *Chronometer*, to any single Observation, without meaning the least imputation on the reverend Mr. *Smith*, to whom *Indian Geography* is much indebted.

But were we to admit the reverend Mr. *Smith's* Observation at COCHIN, what argument is there for not admitting *his* Observation at Madras? altho' from a full knowledge of my deceased Friend the Hon. Mr. *Howe's* exact precision in the use of the best Instruments, with which he was well supplied, my confidence in his Observation is much greater, than in the single Observation of any other Person; yet the *Longitude* of MADRASS by every other Observation, except the reverend Mr. *Smith's*, is made less than the Hon. Mr. *Howe's*.

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It



It will however be satisfactory to see how far the reverend Mr. Smith's Observations, comparatively, confirm the supposition that the PROMONTARY of INDIA is narrower than commonly reckoned.

|                                   | H. Tho. Howe | Capt. Dundas | Reverend Mr. Smith<br>calculated |               |
|-----------------------------------|--------------|--------------|----------------------------------|---------------|
|                                   |              |              | by himself                       | by Astr. Roy. |
| Longitude of MADRASS              | 80° 28'.45"  | 80° 28'.15"  | 81° 1'.45"                       | 80° 41'. 0"   |
| Longitude of COCHIN               | 75.58. 0     |              | 76.26.30                         | 76.26.30      |
|                                   |              | 4.30.15      | 4.35.15                          | 4.14.30       |
| Add for error of Tables at COCHIN | -            | -            | 3. 0                             | 3. 0          |
|                                   |              |              | 4.38.15                          | 4.17.30       |
|                                   |              |              | Mean 4.27.52                     |               |

and thus, by the comparison of the reverend Mr. Smith's Observations, we have the PROMONTARY nearly as it was. \*

Altho' I cannot therefore concur in my Friend Major Rennell's deduction, I shall be much better pleased to

\* Correcting the Longitude of COCHIN as in Note Page 7. This Statement will stand thus:

|                      |               |             |                |             |
|----------------------|---------------|-------------|----------------|-------------|
| Longitude of MADRASS | 81° 1'.45"    | 80° 41'. 0" | 81° 1'.45"     | 80° 41'. 0" |
| COCHIN               | 76.34.15      | 76.34.15 or | 76.23.30       | 76.23.30    |
|                      | 4.27.30       | 4. 6.45     | 4.38.15        | 4.17.30     |
|                      | Mean 4°17'.7" |             | Mean 4°27'.52" |             |



to learn from *positive data* that I am *wrong*, than remain in *doubt*, with however strong probabilities, that I am *right*; and I am fully convinced that he entertains the same sentiments: for I am confident *TRUTH* is the Object in pursuit of both; and we both know that *errors* in *Geography* cannot be sustained by *any authority*; tho' it is a misfortune, incident to the Science, that a Geographer must labour with doubtful, almost distracting, materials, before he obtains *certain data*, when he finds almost all his Work to do over again, even if, by happy conjecture and combination, he has approximated the Truth: This Obscurity will be no bar to our Successors, who, by the common use of Chronometers, will acquire, without labour, a *precision* to which all our Investigations cannot reach.

From *Cape Mons* to *Surat* is taken from the *Chart* I have published of *GUZURAT* and *SCINDY*: *Surat* being supposed in  $21^{\circ}11' \text{ N. Lat. } 72^{\circ}48' \text{ E. Long.}$  or  $10'$  East of *Bombay*, according to the *Map* of *General Goddard's* March, obligingly communicated by the late *Sir William James*.

The *Southern Part* of the *PROMONTARY* and *CEY-LOAN* are taken from a particular *Hydrographical Map* I have constructed, not yet published.

The



The *Coast* of CHOROMANDEL is also from a particular *Hydrographical Map* not yet published.

The *Coast* of Bengal is reduced from that published by me in 1772.

I have inserted the SCHEDAM ROCK, to the *Eastward* of POINT PALMIRAS, from the Voyage of the *Mary* Capt. *Richard Holden*; which is the only Testimony I have found of its *existence*; but I think that testimony is so conclusive as to put the matter out of question: Of this Ship there remain two Journals, one by the Captain, the other by George Wentworth Pitt, the Chief Mate, who was afterwards a Captain in the Service. I have distinguished their Reports by C. and P.

16th December 1712 At Noon The Southmost Pt. of *Sager* bore { NNE C. 2 leag. dist.  
NE P. about 2 leag.

17th H Weather Winds Course K. F. Soundings

1.5½ small gales at N run into 5 then deepend to 6 About 2 PM. Southmost part of *Sager* bore NNE. 4 leag. P.

At which time *Pt. Palmiras* WbS 22 leags allowing it to lye in 20° 45' N. P.

At 5½ H. → in 6¼ C. 5½ P. and lay till morning

P. { AM 8 weighed . NE  
9 . . . NSE \* SbE  
10.12 . . . from ¼ l. 6

At 8 AM weighed, the Wind at NE. and steered away SbE 'till 12, deepening to 7 fath.

Bearings and Distance allowed, Lat. A 20° 50' N. M Dist. from the *Point* 1° 7' E Long. 10.69 P. 18th

\* So in original.



|                  |      |      |        | C.    |    | P. |    |                                                                      |
|------------------|------|------|--------|-------|----|----|----|----------------------------------------------------------------------|
| H                |      | Wind | Course | K.    | F. | K. | F. |                                                                      |
| 18 <sup>th</sup> | 1.   | NbW  | S½W    | 1     | 3  | 1  | 2  | These 24 hours fair weather and a fine easy gale                     |
|                  | 2.3  | N    | SbW    | 4     | 2  | 4  | 2  | wind at NbW. N and NbE. C.                                           |
|                  | 4    | NbE  | SSW    | 2     | 5  | 2  | 5  | At 2 PM The <i>Pilot</i> left us in 15 fms. We ex-                   |
|                  | 5    | .    | SWbS   | 2     | 2  | 2  | 2  | pected to see the <i>Sloop</i> that was cruising in the <i>New</i>   |
|                  | 6    | .    | SSW    | 2     | 5  | 2  | 5  | <i>Deeps</i> in 10 fm. water, but we never saw or heard              |
|                  | 7    | .    | SW     | 2     | 2  | 2  | 2  | any thing of her. C.                                                 |
|                  | 8 12 | .    | .      | 12    | 6  | 12 | 6  | At 8 AM Looking out of the <i>Balcony</i> I saw                      |
|                  | 1. 8 | .    | .      | 21    | 5  | 21 | 5  | <i>Schuydam</i> bearing EbN distant 7 miles. The <i>biggest</i>      |
|                  | 9.10 | .    | .      | 4     | 5  | 4  | 5  | part was a <i>single Rock</i> about the height of a <i>yawl-sail</i> |
|                  | 11   | .    | .      | 1     | -  | 1  | 1  | out of the water and <i>Breakers</i> round about it a                |
|                  | 12   | .    | .      | 2     | -  | 2  | -  | cables length: then the <i>Mairmaid</i> , <i>Severn</i> , and        |
|                  |      |      |        | <hr/> |    |    |    | <i>Samuel</i> and <i>Jane</i> left us and steered SSE we             |
|                  |      |      |        | 58    | -  | 58 | -  | steered SW. C.                                                       |

In the Night many *Riplings*. P.

At 8 AM Saw *Schiedam* bearing EbN about 7 miles dist. being a *single high Rock*, as high above water as a *large Boat under sail*, with *Breakers* all round on the *sand*. P.

This Morning the *Severn*, *Leopard* and *Mermaid* left us. P.

D.L Dep. Lat. O. MDist.

C. Course from yesterday Noon in 7 fms. S 37°W 57' 45' 34' 20°14'N. c°34'W.

P. At Noon had a good Observation }  
 which is not so far to the South- }  
 ward as Account by 8 miles which } S37.W . . 33 20.14 . 0.34E. Long.by 1.35.35E.  
 allow *also* \* Lat. true }  
 course being. . . . }  
 ☉ Z. Dist. 43.30  
 ☉ Decl. 23.16 20.14 Lat.

The

\* So in original.

D



The Captain's Reckoning  $0^{\circ} 34' W$  is apparently a Mistake; The Course from 8 AM to Noon was SW 7.5 by Captain; SW 7.6 by Chief Mate: which at 8 AM gives for Latitude A  $20^{\circ} 19\frac{1}{2}' N$ ; allowing Current for 8 hours, at 8' per day, is  $2'. 40'' = Lat. 20^{\circ} 17' MDist. 0^{\circ} 40' E$ : EbN 7 miles, gives  $1' N$  and  $7' E$ ; SCHEDAM will therefore be in Lat.  $20^{\circ} 18' N$ , MDist. from Point *Palmiras*,  $0^{\circ} 47' E$ .

The *East Side* of the Bay of BENGAL, is delineated from the various materials published by me with Capt. *Ritchie's Journal*; since then, I have received from Capt. *Thomas Larkins* the following Memorandum, taken from

"REMARKS on the *Southern-Passage* from BENGAL to BOMBAY  
by

Capt. *William Richardson*.

"If you sail from Bengal the 15<sup>th</sup> April, after leaving the Pilot, you should steer SE or even SEbE, as the Winds will permit you, to make sure of getting hold of the *Land of Negrais*; and if possible run to the Eastward, between the *Alguada* (or *Sunken Islands*) and the *Preparis*, or between the *Preparis* and *Cocos*; both which are fine clear *Channels*.

"The *Sunken Islands* are a dangerous Shoal to those unacquainted with them, being out of sight of Land, but may be very safely approached, as the *soundings*, which are



are *Coral Rock*, run a good way to the Westward, from 12 into 30 fathoms; so that a Ship having once got *soundings* on them, may run to the SSW till the water deepens to 35.36. and 38 fath. *fine sand* and *mud*; which is the best Track to keep in: Then steering SSE and SEbS between *them* and the *Preparis*, You'll get within the *Islands*, and may be certain of having a fresh breeze from the Northward, to carry You to the South Eastward. But observe the *true Latitude* of the *Sunken Islands* is  $15^{\circ} 40' N$ , which is  $20'$  to the Northward of their situation in the *New Directory*; After you are thro' this *Channel*, you may steer for *Narcondam*, and go to the Eastward of *It*; make the *Sayer Islands* and *Junk-Ceylon*, from whence you will have the Winds from the Eastward, out of the *Straits* of *Malacca*, and run over to *Acheen-Head*. The *Sayer* and *Alady Islands* are all bold and safe to run thro'; the *two Islands* laid down in the *Directory* in the Latitude  $10^{\circ} N$  do not exist.

I suppose you will be down at *Acheen* in 18 or 20 days and before the Westerly Winds set into the *Straits* of *Malacca*, when the SW Monsoon hath commenced; if you go there late in May, keep to the Westward in order to weather *Acheen-Head*.

“Should it so happen that the Winds hang to the Eastward, which is not likely, for they generally are NNW all April and great part of May, and that you cannot



cannot get thro' the *Channels*, to go to the Eastward of the *Islands*, in that case, Take care of a *long shoal* of coral rock, lying 10 leagues to the Westward of the *High Mountain* on the *Great Andaman*, with  $4\frac{1}{2}$  fath. on it, and probably less, for it is only known to a few, who have been on it, and wished to get off as fast as possible, It hath never been surveyed, but my chief Officer ran due West on it for *two leagues* in 6 to  $4\frac{1}{2}$  fath. and supposes that to be the *breadth* and that it runs lengthways North and South, as the *Islands* do: I have met with only three People who had *soundings* on it, and no part being above water, it hath never been thought of."

The *Longitude* of *no Place* on the *Eastern Side* of the BAY of BENGAL, being determined either by *Astronomical Observations* on shoar, (except MERGUI) or by *Chronometers*. The *exact* position of ACHEEN may perhaps not be what it is here laid down: one Journal, of the Ship *Lord Camden*, 1766, reports to have seen both the *Nicobars* and the *Islands* off ACHEEN at once; but, according to custom, the other Journals of that Ship contradict this; the necessary attention to connect them exactly unfortunately was not paid on that occasion; Bearings from Mast Head, carelessly taken, of *distant Lands* being incompetent to an exact determination.

The *pretended Observations* of P.P. de Beze and Camille, at MALACCA in 1689, I consider merely as imposition; for men confined in prison, as they alledge they were, to be  
able



able to observe *Eclipses* of *Jupiter's* Satellites require supernatural assistance, which I have not faith to admit in *Geography*: but were the *Observations* allowed to be genuine, the Reports of them are so full of contradiction that they deserve no confidence. \*

The

\* *Vide* Mem. de l'Acad. des Sciences Vol. 9. p. 164. These Observations are twice mentioned with different numbers, *P. Gouye* has given the corrected times at *Paris*, and says those of the Malacca Observations of 29 Sept. and 8 Nov. 1689 were sent by *P. P. de Beze* and *Camille* to *P. Richaud*, but that he could assign no reason why they omitted to take notice of the Observations of 21 Sept. and 23 Oct. 1689.

I have put down in the 1<sup>st</sup> Column the Times at *Paris*, in the 2<sup>d</sup> the Times in the Account sent to *P. Richaud*, in the 3<sup>d</sup> the Times given by *P. Gouye* from their Papers: in the 4<sup>th</sup> is the Longitude between *Paris* and *Malacca*, according to the numbers sent to *P. Richaud*, and in 5<sup>th</sup> the Longitude inferred from their Papers.

|                                        | at Paris |    |    | at Malacca                                    |        |      |
|----------------------------------------|----------|----|----|-----------------------------------------------|--------|------|
|                                        | h        | m  | s  | h                                             | m      | s    |
| 21 Sept. 1689 Em. 1 <sup>st</sup> Sat. | 5        | 10 | 00 | 11.39PM                                       | 00     | 00   |
| 29 . . . D <sup>o</sup> . . .          | 7        | 00 | 00 | 1.53AM                                        | 1.37AM | 6.53 |
| 23 Oct. . . D <sup>o</sup> . . .       | 1        | 50 | 00 | 8.30PM                                        | 00     | 00   |
| 8 Nov. . . D <sup>o</sup> . . .        | 0        | 10 | 00 | 6.56                                          | 6.50   | 6.46 |
|                                        |          |    |    | Mean 6.49 $\frac{1}{2}$ 6.38.45               |        |      |
|                                        |          |    |    | Longitude from Paris 102° 12'.30" 99° 41'.15" |        |      |
|                                        |          |    |    | Paris to Greenwich 2.21.15 2.21.15            |        |      |
|                                        |          |    |    | 104.33.45 102. 2.30                           |        |      |

E



The Observation, in 1740, at Mergui of an Immerſion of *Jupiter's* 1<sup>st</sup> Satellite by M. D'Aprés, places it in  $98^{\circ} 19' E$  from *Greenwich*: as the circumstances of this Observation are no where published, it loſes much of its value, by the conſideration that, in 1740, the *Tables* were in a much more imperfect State than at preſent; and, even now, a ſingle Observation, by a practiſed Obſerver, cannot be relied on without a correſponding Observation: The Observation at Mergui, therefore, does no more than reſtrain to a moderate quantity the error in the Longitude of that Place. I do not know that M. D'Aprés any where mentions with what Inſtruments, or at what Place, he obſerved; but the Longitude given by him is *That* of the *Town* of Mergui. Unfortunately this Matter never came particularly under diſcuſſion during his life, for I have no doubt, from his known liberality of Sentiment, and earneſt endeavour to promote the Intereſt of Navigation, He would have given all the Satisfaction that could have been wiſhed. An Eclipse of  $\gamma$  in 1612 by P. Spinola gives  $98^{\circ} 10' E$ .

I have ſeveral Observations of *Longitude* by *Lunar Diſtances* for the *ACHEEN Iſlands* and thoſe adjacent; but Lunar Observations at Sea are incompetent to fix reciprocal Longitudes of *Places*, ſo near to each other; and the Observations do not agree together, ſo that we muſt have patience 'till The exact Longitude can be obtained by Chronometer.

Having



7<sup>th</sup>. July, 1785.

Having received this day, from Capt. *Joseph Huddart*, a most valuable Series of Observations on the MALABAR COAST, from 17<sup>th</sup> Nov. to 31<sup>st</sup> December 1784; the *Longitudes* being determined by another of *Arnold's Chronometers*, the error of which during that period, from BOMBAY to ANJENGO and back to BOMBAY continued on to 3<sup>d</sup> Jan. 1785, was only *nine seconds* of Time or 2'. 15". of *Longitude* in these forty seven days. The result of Capt. *Huddart's Longitude* of COCHIN, from the *Mean* of *three* Observations, is  $75^{\circ} 59'. 45''$  or  $1'. 45''$ . more than Capt. *Dundas*: they differ so little that I think the Matter is placed beyond a doubt, if the *Longitude* of BOMBAY and MADRASS are truly determined: Capt. *Dundas's* Observations at ANJENGO placed it in  $76^{\circ} 28'$ . and  $76^{\circ} 32'$ ; Capt. *Huddart* places it in  $76^{\circ} 35'$  and my own Observations, by *Chronometer* from *Point de Galle*,  $3^{\circ} 33'. 51''$  taken from C. *Dundas Longitude* of *Point de Galle*  $80^{\circ} 7'$  gives  $76^{\circ} 33'. 9''$  for the *Longitude* of ANJENGO: All the *Longitudes* inferred on the MALABAR COAST are on a supposition that BOMBAY is in  $72^{\circ} 38'$  if therefore BOMBAY be found in a different *Longitude*, all those places will require a correction by the same difference.

The



The valuable Observations, so attentively and obligingly communicated by Capt. *Huddart*, will enable me to give a more correct CHART of the MALABAR COAST than any yet published; but these Observations do not require any further Notice in THIS MEMOIR, except so far as concerns CAPE COMARIN and from thence to COCHIN: which will stand as follow

|                  | N. Lat. | E Long. |                                          |                    |             |
|------------------|---------|---------|------------------------------------------|--------------------|-------------|
| Cape Comarin     | ° /     | 77° 22' | by <i>Arnold's Chronometer</i> to Ajengo | 77° 22' 15"        |             |
|                  |         |         | from Point de Galle                      | 77° 22' 24"        |             |
| Cadiapatam Point | 8.7     | 77° 11' | D <sup>o</sup> to Ajengo                 |                    |             |
| Anjengo          | 8.41    | 76° 33' | from Point de Galle                      | 76° 33' 9"         |             |
|                  |         |         | C. Dundas                                | { 76.28<br>76.32 } | 76.30       |
|                  |         |         | C. Huddart                               |                    | 76.35       |
|                  |         |         | Mean C. Huddart and C. Dundas            |                    | 76.32.30    |
| Cochin           | 9.58    | 75° 59' | C. Huddart                               |                    | 75° 59' 30" |
|                  |         |         | C. Dundas                                |                    | 75.58       |
|                  |         |         | Mean                                     |                    | 75.58.45    |



